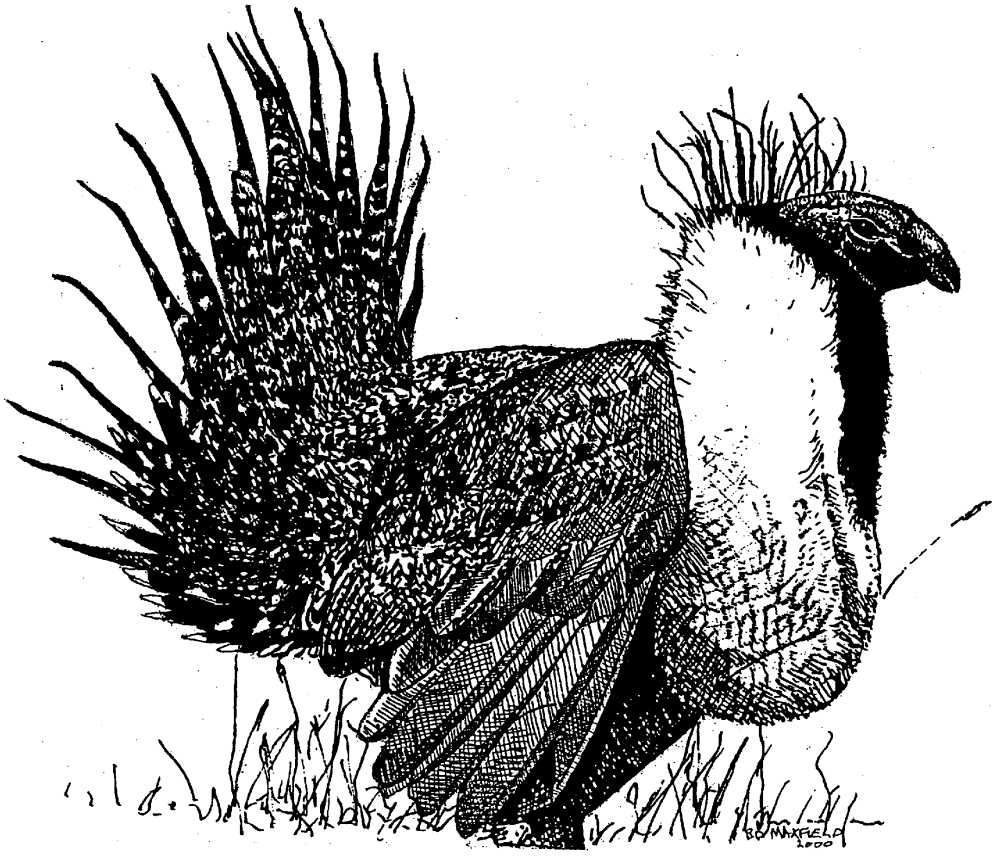
# Annual Report
# (2002)

# Parker Mountain Adaptive Resource Management Plan



**February 2003**

# 2002 ANNUAL REPORT

# PARKER MOUNTAIN ADAPTIVE RESOURCE MANAGEMENT PLAN

**Cooperators**

**Parker Mountain Grazing Association**
**Wayne and Piute County Commissions**
**Utah Department of Natural Resources**
**Utah School and Institutional Trustlands Administration**
**Utah Division of Wildlife Resources**
**U.S. Bureau of Land Management**
**U. S. Forest Service**
**U.S. Fish and Wildlife Service**
**U.S.D.A. Wildlife Services**
**U.S.D.A. Farm Services Agency**
**U.S.D.A. Natural Resource Conservation Agency**
**Utah Farm Bureau Federation**
**Utah State University Vice President for Research**
**Utah Agricultural Experiment Station**
**Utah Department of Agriculture and Food**

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**February 2003**

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## EXECUTIVE SUMMARY

The Parker Mountain Adaptive Resource Management Plan (PARM) Working Group became operational in 1998. PARM was organized to assist local communities in Wayne and Piute Counties to address sage-grouse conservation and local socio-economic issues. The group has focused its efforts on restoring rangeland vegetation diversity on Parker Mountain. PARM believes these efforts will benefit both local communities and Greater Sage-grouse populations. Currently, Greater Sage-grouse populations on Parker Mountain appear to be increasing. In 2002, we recorded the highest lek counts ever on Parker Mountain. The counts were ~13% higher than last year's count.

In 2002, we monitored the seasonal movements and status of 24 hens that were fitted with radio-collars. Nineteen of the radio-collared hens (80%) nested. Most nests were initiated between late April and mid-May. Nest initiation dates for this year was similar to previous years.

Five nests (25%) were predated in 2002. Nest abandonment was 15% (n=3). This is similar to last year but high relative to previous years. One nest was abandoned because of investigator activities. The average clutch size was the slightly lower than previous years (5-6 eggs per nest). Nest success in 2002 was slightly higher (58%) than compared to 2001 (50%).

In 2002, hen movements from lek to nest sites to brood-rearing areas was less pronounced than in 2001. The hens were attending higher elevation leks leaving the largest leks at low elevations with unusually low attendance rates. Nesting frequently occurred near the leks, as opposed to many miles away (ex. Bull Roost lek). We attribute this behavior to the unusually dry spring resulting in especially poor production of grasses and forbs at lower elevations. The high attendance at the usually smaller, higher elevation leks was unprecedented. Concurrently, the attendance at the largest, lower elevation leks at was at record lows.

Experimental Treatments

In October 2000, four 100 acres plots were treated with the tebuthiuron (spike). The vegetation response of the sagebrush to the tebuthiuron treatments was readily evident. Although, after vegetation measurements were made in 2001, there was no significant difference in vegetation cover detected between the treated and non-treated sites. We suspected that the exceptionally wet year and the delayed effects of the tebuthiuron made it difficult to record a measurable response. This summer (2002), an exceptionally dry year, there was a significant forb response measured on the spike treatment plots. Given the extremely dry weather conditions in 2002, the response of the forbs is that much more critical for broods in the area. The grasses declined in abundance on both the control and the treatment plots.

We were concerned about the impact rabbits in the study area might be having on vegetation response. To monitor this effect on Parker Lake pasture, we constructed additional rabbit-proof exclosures next to the exclosures constructed the previous year. The rabbit exclosures showed that rabbits were impacting grasses and forbs. The addition of rabbit exclosures added a dimension to the experiment that was originally not included. This research will provide important information regarding the impacts high density rabbit population on forage production.

In October 2001, four 100 acre plots were treated using the Dixie harrow. Another four 100 acre plots were treated with the Lawson aerator. These plots were to be rested from grazing for two growing seasons but the extremely dry summer in 2002 led to emergency grazing in August.

PARM representatives also began working with several partners to explore the possibility of developing a Utah prairie dog mitigation bank. In addition, PARM received a grant from NASA to evaluate the use of remote sensing and GIS technology for estimating forage production and utilization.

## 2002 RESEARCH ACTIVITIES

### Hen Captures

In January 2002, 14 radio-collared Greater Sage-grouse hens on Parker Mountain were still transmitting signals. These hens were relocated on their traditional wintering areas during a telemetry flight conducted by study personnel and Utah Division of Wildlife Resources (UDWR) pilots. The hens were wintering on and around the Black Point lek site and the Bull Roost lek site areas. Since we started monitoring Parker Mountain Sage Grouse population, we have recorded a large numbers of birds wintering in these areas.

In March 2002, we attempted to capture an additional 13 hens and fit them with radio-collars. We attempted to capture these birds near the Bull Roost lek site (Figure 1), where we have captured hens in the past. We were finding very few hens and decided to try the ridges around the higher elevation leks. Based on what we were seeing with the male lek attendance, we were hoping for better success. We trapped an additional 13 hens around the Cedar Peak and Joel's leks with much success.

### Lek Counts

Lek counts began March 30 on the largest lek, Bull Roost. The lek counts at the largest leks, Bull Roost and Black Point were unusually low this year. We did record an unprecedented lek attendance at the higher elevation leks. In addition, while trapping up at the higher leks, we discovered a lek we have not previously identified. The lek is between Cedar Peak and Burnt Knoll. At this lek, "Joel's lek", we counted 39 males strutting but could not make out hens because of distance and poor visibility. In the future, a spotting scope will be necessary to count this lek. Overall, lek counts increased from 543, last year, to 652 this year. Not including Joel's Lek, the lek counts still increased by 15% increase from 2001 lek counts and are the highest lek counts recorded since 1970's high count of 543 males (Figure 1). We attribute this to the extremely dry winter.

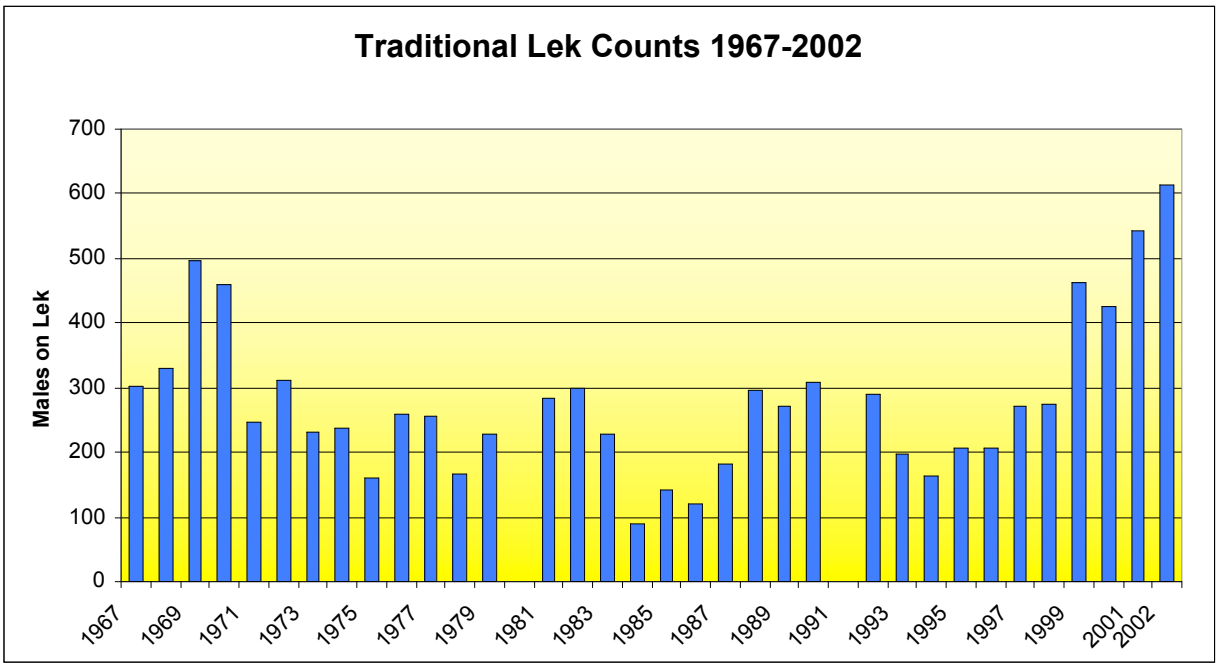



Figure 1. Historical lek counts trends of the Parker Mountain Sage Grouse Population

## Monitoring Parker Mountain Greater Sage-grouse Hens

In mid-May, we began monitoring of 24 hens to determine their seasonal habitat use patterns. We were interested in identifying and describing the habitats they used for nesting and brood-rearing. We also wanted to determine their nesting success, chick and adult hen survival rates.

### *Nesting Activity*

The radio-collared hens began nesting (incubation) between April 22 and May 5. This was a week earlier than 2001 but the same as 2000. Between late April and mid-May, 19 of the 24 collared hens (80%) had established nests.

During the incubation period (~28 days), five nests (25%) were depredated and three nests (15%) were abandoned. Of the three abandoned nest, two were incubated for >40 days and then abandoned. For some reason, the eggs were not viable. Of the depredated nests, three (15%)

were destroyed by avian predators (ravens) and two (10%) were mammalian. Eleven (58%) remaining nests successfully hatched chicks. The average clutch size (not including the abandoned nests) was 5-6 eggs per nest.

***Brood-rearing activity***

Recent information from studies conducted in southeastern Idaho, suggests that chick survival cannot be accurately assessed after 21 days of age. After 3 weeks of age, chicks have been documented to "brood hop". If broods are hopping from hen to hen after three weeks of age, counting the number of chicks with a particular hen may be unreliable.

Therefore, we to present brood survival data with respect to hens that still appeared to have a brood throughout the summer (Figure 2). Two hens lost their broods within 21 days. Three hens lost their broods between 21 and 42 days. Finally, 5 hens maintained broods past 42 days.

Over the course of the summer, similar to past years, the hens with broods and hens without broods generally moved in a southerly or southeasterly direction on Parker Mountain. This direction coincided with an elevation gain (as has been documented the previous 4 years). Although the direction was similar to past years, the movement to higher elevations was markedly earlier this summer than in past years. The distances traveled by hens this year were generally not as far as in 2001. The longest distance traveled from nest site to late brood-rearing habitat was 8.8 miles versus 13.7 miles in 2001. The distances traveled this year by radio-collared hens were lower due to the use of the higher elevation leks.

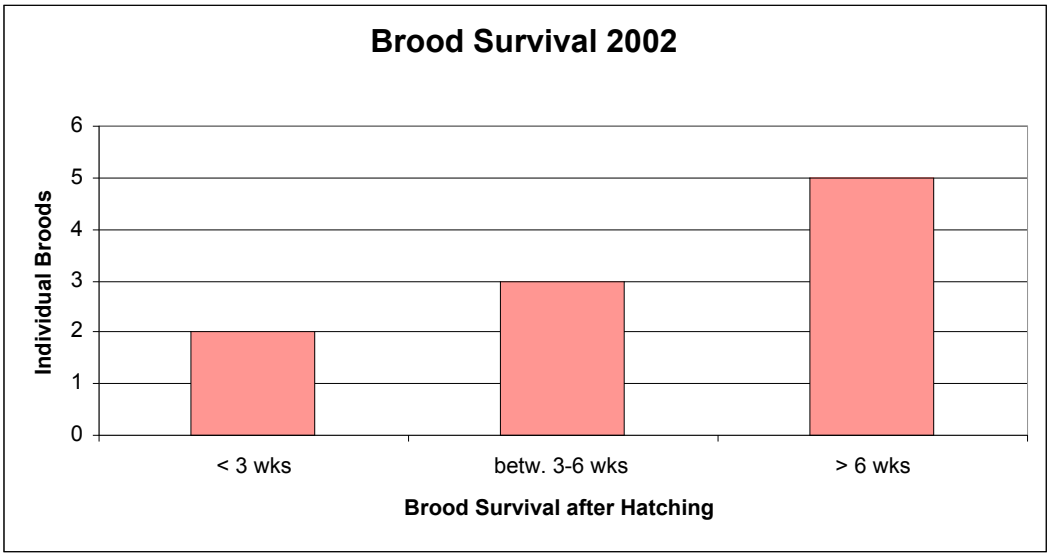



Figure 2. Number of hens that maintained broods past 6 weeks, Parker Mountain, 2002.

***Status of Adult Hens***

A single winter mortality was found during the January 2002 flight. Then, from March to November 18 2002, 9 out of the 26 radio-marked hens were mortalities. This represents a survival rate of 65% compared to 76% for 2002. One of the hens was a confirmed coyote kill. One of the hen mortality was due to an avian predator. The cause of death for four collars was undetermined. Three remaining collars have yet to be retrieved from the field site.

**Parker Lake Experimental Pasture**

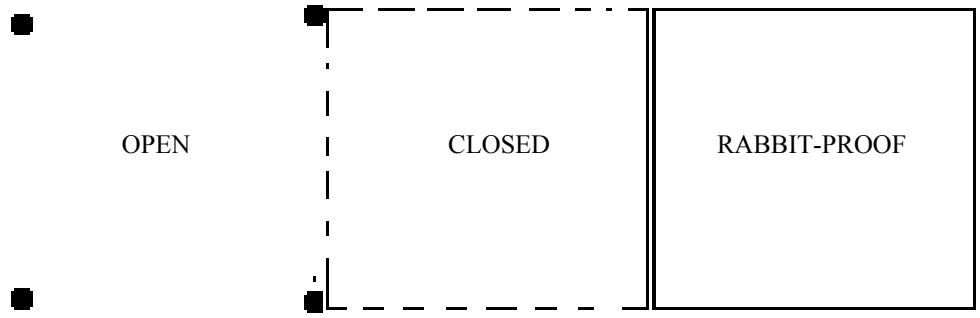
Based on work conducted by Joel Flory, the Parker Lake Pasture was selected by the Parker Mountain Adaptive Resource Management (PARM) working group in early 2000 as the experimental pasture to evaluate the effect of several sagebrush management treatments on Sage Grouse and vegetation diversity. Three sagebrush management treatments would be implemented on the pasture to evaluate the effect of the treatment on reducing sagebrush canopy cover and vegetation diversity.

In the spring 2000, 18 plots were mapped across the landscape encompassing the largest, thickest stands of big mountain sagebrush (*A. tridentata* ssp. *vaseyana*). During the fall of 2000, four plots were aerially treated with tebuthiuron (Spike) at three-tenths pound per acre. The other Tebuthiuron treatments and Dixie harrow treatments were delayed due to early snowfall on site. The remaining plots were treated in October 2001. Four of the plots were Dixie harrowed and four were treated with the Lawson aerator. The aerator was provided by the UDWR. The sites that were harrowed were reseeded with a specially designed seed mixture provided by the UDWR.

During the summer of 2002, staying consistent with the past two years, we conducted three types of vegetation sampling in the experimental plots (Control, Dixie Harrow, Lawson Aerator, and Tebuthiuron). We conducted the point-intercept sampling and line-intercept sampling from GPS locations identified and used in the two previous years. From these points, a 20-meter tape was stretched out in the random direction chosen in 2000. The point-intercept sampling was conducted at each meter and the basal cover type recorded. We supplemented this method with a Daubenmire frame (Daubenmire 1959) at every 4 meters to "double sample" and compare results. The line-intercept sampling was conducted to measure the canopy cover of the shrubs. Both of these methods were conducted in June and July, corresponding to early and late brood-rearing periods of time on Parker Mountain.

To measure the lagomorph utilization of the herbaceous understory vegetation, we constructed rabbit-proof exclosures. The exclosures that were constructed the previous year were added onto with an additional exclosure of equal size (16 x 16 feet) (Figure 3). Then, we sampled the squares (open, closed to large ungulates, closed to large ungulates and lagomorphs) in the same way done in 2001. We estimated the basal percent cover with Daubenmire frames on a grid within each square. The vegetation in the exclosures was sampled once mid-month from June to September.

Figure 3. Exclosure sampling pattern: Open to everything, closed to large ungulates, closed to large ungulates and rabbit-proof.




***Experimental Treatments***

Tebuthiuron

There was no measurable response from the understory the first year post-treatment. The second year post-treatment, although the grasses still did not respond, the forbs in the tebuthiuron plots showed a significant response (Figure 4). Considering the extremely dry conditions of 2002, the forb response is particularly unexpected. The availability of forbs during such a dry year provides the broods a nutritional source that might not have been available without the treatment. This provides a valuable management tool to specifically improve sage-grouse brood habitat. With average precipitation, the response of the grasses to the treatment might have been more positive. The variable precipitation in this particular area should be taken into consideration when planning a vegetation treatment, particularly if seeding is involved.

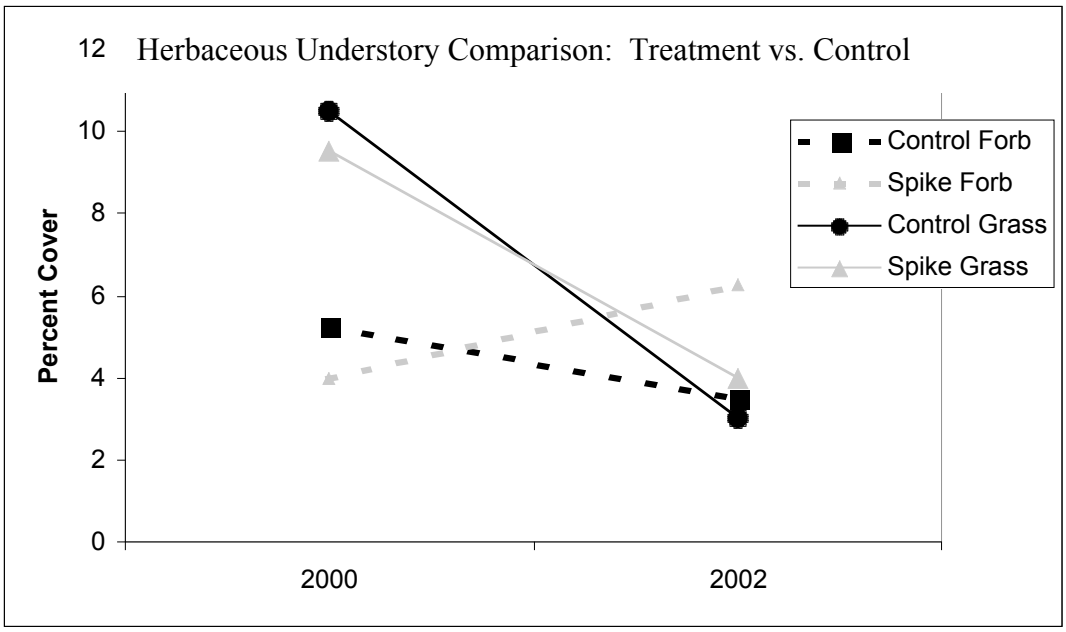



Figure 4. The treatment plots and control plots all show a decline in grass abundance. The forbs in the spike plots are the only positive response from 2000 to 2002.

Dixie Harrow

The Dixie Harrow treatment was completed October 2001. In June and July 2002, we collected the first year post-treatment data using the point-intercept sampling technique. We have not analyzed the herbaceous understory components in the treated areas from 2001 to 2002. Due to the extremely dry year, from our observations, there appeared to be little understory growth in any of the plots (control or treatment). The Dixie Harrow plots were seeded at the time of treatment, the viability of the seeds for the 2003 growing season is unknown. The Dixie Harrow plots did show a higher percentage of herbaceous understory than the control plots, particularly in July (Figure 5). With average precipitation, we expect to see a greater response in the second year of data collection.

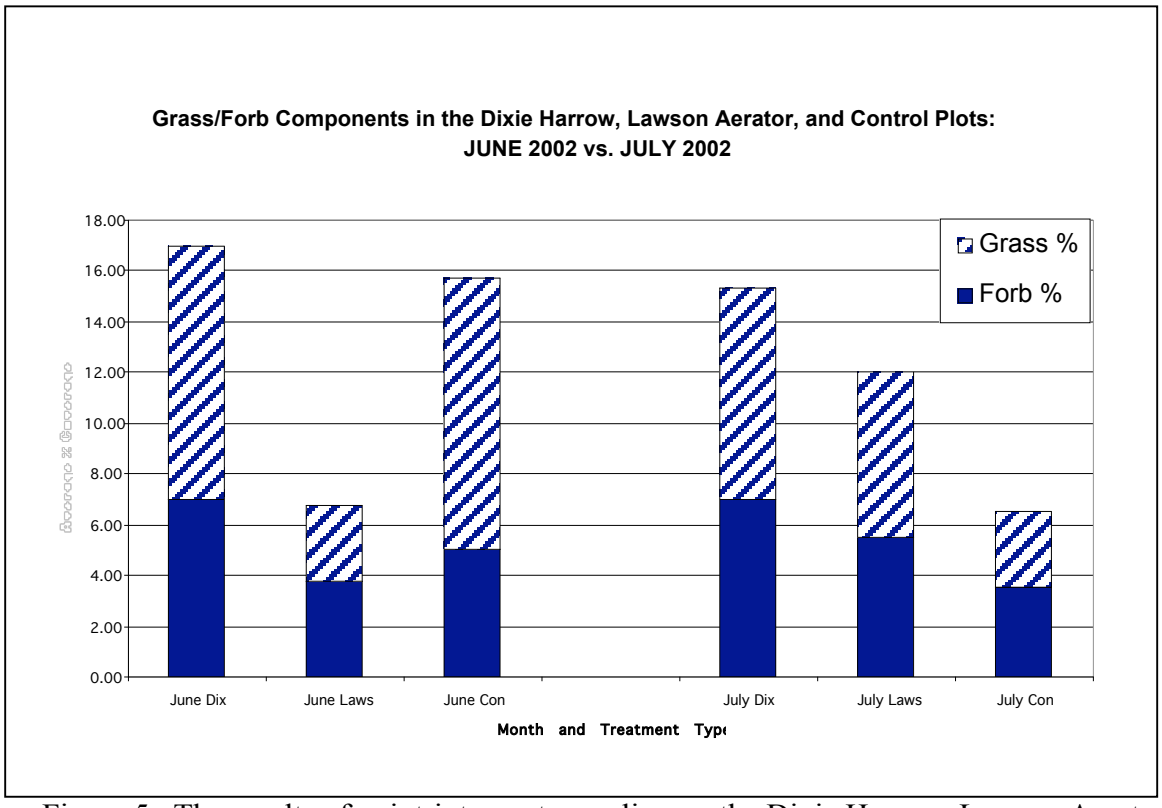



Figure 5. The results of point-intercept sampling on the Dixie Harrow, Lawson Aerator, Control plots in June and July 2002. The treatment plots maintain a higher grass/forb component than the control plots in mid-summer. This could provide valuable late brood-rearing habitat for hens during dry years.

Lawson Aerator

The Lawson Aerator treatment was completed October 2001. In June and July 2002 we took the first series of post treatment data using the point-intercept sampling technique. The Lawson Aerator understory did increase from June to July despite the dry conditions (Figure 5). The increase was significant in comparison to the decrease in understory within the control areas.

Rabbit Exclosures

The rabbit exclosures showed some interesting results this year. Herbaceous understory abundance data collected from June to September suggests rabbits may be having an impact on

forage production in the treatment area. In the Spike plots, there was no discernable grass/forb component pattern in June, July, and August. In September, a distinct increase in forb component is obvious in the rabbit-proof exclosures while the other exclosures show a decline (Figure 6).

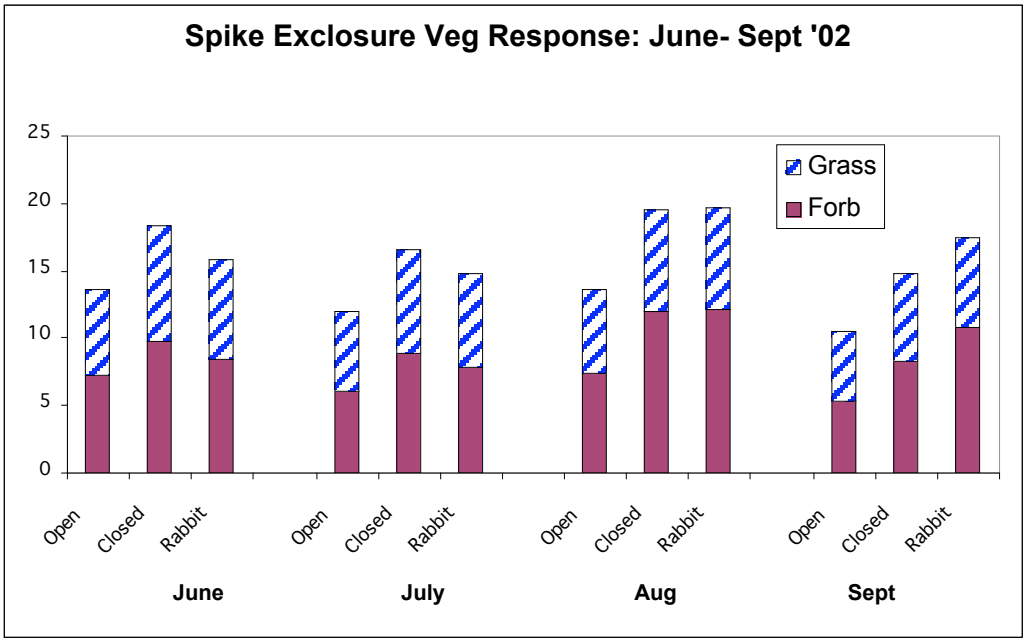



Figure 6. The herbaceous understory is variable from June through August but show an expected pattern in September. When rabbits are most numerous, they are having a large impact on available grass/forb resources.

In the Dixie Harrow plots, the consistently increasing grasses and forbs are apparent. This pattern drops off in September with the "open" and "closed to large herbivores" exclosures decreasing significantly. The "rabbit" exclosure is the only one to maintain a 15% forb component (Figure 7). As with the Spike plots, September seems to be when the rabbit herbivory is most significant.

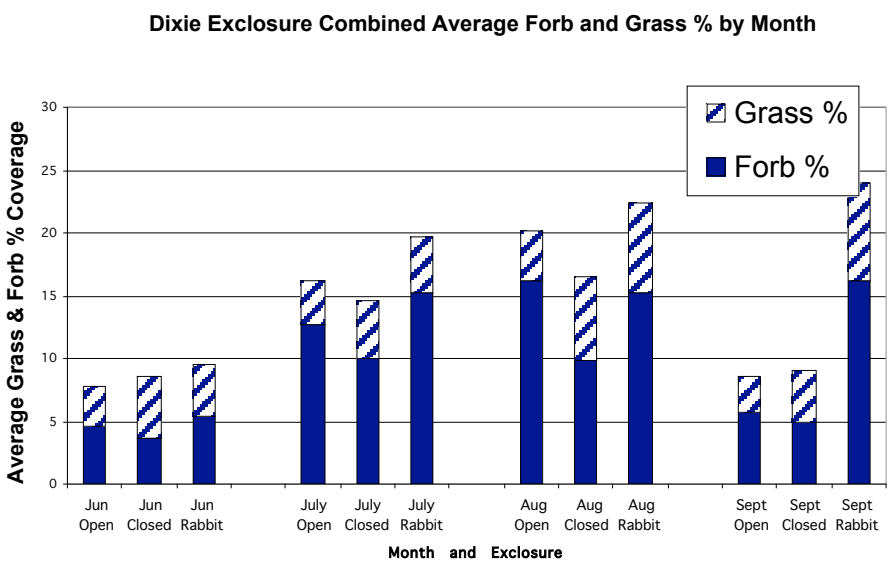



Figure 7. Notice the pattern of increasing forb component throughout the summer until September. The rabbit-proof exclosure is the only exclosure to maintain a 15% forb component.

The Lawson aerator exclosures showed a similar pattern to the Dixie Harrow exclosures, though the effect of rabbit herbivory was not as pronounced. The understory increased through June, July, and August (Figure 8). Unlike the Dixie Harrow exclosures, the Lawson Aerator exclosures did not show much of a change from August to September (Figure 8). Although, during the time of highest rabbit herbivory in the other plots (September), the "rabbit" exclosures did have a higher herbaceous understory percentage than the other two exclosure types that were open to rabbit herbivory (Figure 8).

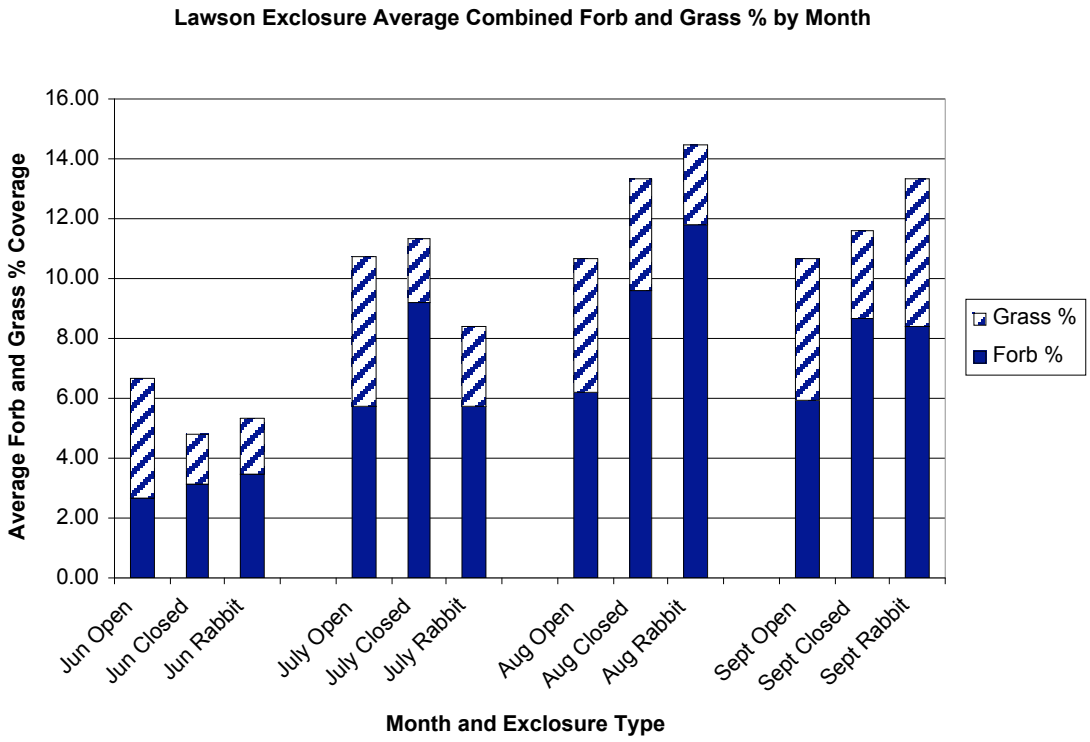



Figure 8. The Lawson Aerator exlosures showed a similar pattern as the Dixie plots from June through July. In September, there was less of a distinctive rabbit herbivory impact.

In August 2002 we did rabbit counts at night to begin gathering data on rabbit populations in the area. After trying different techniques, we decided to drive transects crossing all treatment types at an appointed time after sun down. The routes will be driven regularly this upcoming field season. We hope to get a trend on rabbit populations in the area. We plan to correlate this data to the rabbit herbivory impacts we are seeing in the exclosure data.

## Predation Management

U.S.D.A. Wildlife Services (WS) has been conducting a predation management program on Parker Mountain. Between December 1, 2000, and June 30, 2001, a total of 111 coyotes and 2 red fox have been removed. Additionally, 2 coyotes dens were removed from sage grouse

nesting areas. A total of 1400 DRC-1339 eggs were placed near the local landfill for raven control.

In addition to protecting Greater Sage-grouse, WS is protecting domestic sheep yearlong in the area. This control program also is benefiting pronghorn.

## Utah Prairie Dog Mitigation Bank

In October 2000, PARM representatives met with staff from Utah State and Institutional Trustlands Administration (SITLA), UDWR, U.S. Fish and Wildlife Service (USFWS), and Environmental Defense to discuss a mitigation bank concept for Utah prairie dogs. Two possible Utah prairie dog mitigation banks sites have been identified on Parker Mountain. These sites are both approximately 200 acres in size. They are located near Flossie Knoll and the Tanks areas. A draft of the mitigation plan concept paper has been prepared by Environmental Defense. A draft management plan was written by Terry Messmer and Joel Flory. The USFWS has received a grant to prepare a regional Utah prairie dog habitat conservation plan (HCP). Once this plan is prepared the mitigation bank concept can move forward. Joel Flory is working to complete the HCP. A draft HCP should be completed by April 2003.

## Monitoring Vegetation Production and Utilization Using GIS Technology

SITLA and Utah State University received a grant through the NASA Affiliated Research Center Program (ARC) to evaluate the use of remote sensing and GIS technology to estimate range forage production and utilization on Parker Mountain. Todd Black was hired as the GIS technician. Walt Hanks was hired through the Wayne County Extension office as the range technician. This work was initiated in June 2001 and was completed in January 2002. A final report of this project will be submitted to PARM partners under a separate cover.

## Conclusions

Greater Sage-grouse populations on Parker Mountain appears to be increasing slightly. This year we observed the highest lek counts ever recorded on Parker Mountain. The counts were ~15% higher than last year's count. This is even despite the extreme fluctuations in precipitation over the last 3 years. This demonstrates the bird's well-adapted ability to endure extreme variability in conditions given suitable habitat conditions. Greater population increases in the subsequent years should be expected in response to the vegetation treatments in Parker Lake Pasture and other treatments that will be implemented in subsequent years.

The sample of marked hens had the highest recorded nesting initiation percentage (80%) ever recorded Parker Mountain. Nest initiation dates for this year was similar to previous years. Nest predation was not significant this year, but nest abandonment was higher than any other recorded year. The average clutch size (5-6 eggs per nest) was slightly lower than last year (6-7 eggs per nest). This decrease in average clutch size may have to due with the dry spring and little pre-nesting grasses and forbs for the hens. Nest success was 58%, higher than last year (50%).

Hen movement this year was lower than that of previous years. The dry spring and hen attendance of higher elevation leks explains the decrease in overall movement. Since the hens move up in elevation during the course of the summer, the higher elevation leks facilitate less mean movement. In addition, the hens moved up in elevation much earlier this year than past years.

The response of the sagebrush to the tebuthiuron treatments was visually obvious. In addition, there was an increase in forb abundance. There was no difference in grass cover between the treated and non-treated sites, they both declined. We suspect that the exceptionally dry year negatively affected a positive grass response. In the literature, past tebuthiuron research has frequently shown a positive response in the grasses but a decline in forbs. Therefore, the forb response to tebuthiuron recorded on in the Parker Lake pasture is particularly significant. Additionally, the forage value of these forbs to the sage-grouse broods is critical, especially in a dry year.

Data collected to monitor the impacts of rabbits on forage production suggests that rabbits are removing greater than 20% of the production in treated areas. Rabbit herbivory of forbs stands out more than grass herbivory. The rabbit herbivory impact was most pronounced during the later summer months of August and September. The timing of noticeable declines in forb herbaceous understory coincides with the timing of maturing young of the year lagomorphs. Next year, coupling this herbivory data with rabbit census data will help us to start looking at rabbit population impacts on the landscape.

**Summary of Biological Information**

I. Lek Counts

| | |
|---|---|
| 1998 | >273 males |
| 1999 | >350 males, up>25% |
| 2000 | >350 males, still up but down slightly from 1999 |
| 2001 | >450 males, up ~20% from last year…highest count in 30 years |
| 2002 | >550 males, up ~15% from 2001…still highest count in 30 yrs |

II. Nest Initiation

| | Y | A | |
|---|---|---|---|
| 1998 | 8/19 | 8/9 | (57%) |
| 1999 | 6/16 | 16/17 | (67%) |
| 2000 | * 13/26 | | (50%) |
| 2001 | * 17/25 | | (68%) |
| 2002 | * 19/26 | | (79%) |

* Denotes combined yearling and adult data

III. Nest Predation

| | | |
|---|---|---|
| 1998 | 3/16 | (19%) |
| 1999 | 10/19 | (53%) |
| 2000 | 2/13 | (15%) |
| 2001 | 6/17 | (35%) |
| 2002 | 5/19 | (25%) |

IV. Adult Mortality

| | | | |
|---|---|---|---|
| 2000 | 6/21 | (28%) | (*by the end of August, only 21 collars were still transmitting) |
| 2001 | 7/25 | (28%) | |
| 2002 | 10/26 | (38%) | |